NorthMet Mining Project and Land Exchange

Preliminary FEIS Extended Comment Form

Agency: GLIFWC

Comment #:

Comment:

GLIFWC Mercury Comments on the "NorthMet Mining Project and Land Exchange: Preliminary Final Environmental Impact Statement (June 2015)"
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Predicted mercury loadings as a result of the NorthMet Project continue to constitute a Major Difference of Opinion (MDO) between to Co-lead and Tribal Cooperating Agencies. These concerns have been raised previously by GLIFWC, Fond du Lac, Grand Portage and others. But, because these issues have not been addressed in the PFEIS, GLIFWC staff feel it is necessary to reiterate these concerns.

In short, the PFEIS states that, based on mercury mass balance analyses, the NorthMet Project would result in a net increase in mercury loadings to the Embarrass River of 0.2 g/year (from 22.3 to 22.5 g/year), which would be offset by a 1.2 g/year net decrease in mercury loadings to the Partridge River (from 24.2 to 23.0 g/year), resulting in a combined overall decrease in mercury loading to the St. Louis River of 1.0 g/year.

We disagree with the treatment of mercury in the PFEIS and the resulting conclusions in three fundamental ways. In contrast to what is laid out in the PFEIS, it is our expert opinion that:

I. Increased mercury loadings to the Embarrass River may not be permittable. A net decrease in mercury loadings to the St. Louis River does not justify or make acceptable the increased mercury loadings to Embarrass River.
II. The mass balance analyses that lead to the conclusion that mercury loadings will not increase in the St. Louis River are flawed in numerous ways. Mercury loadings to the St. Louis River are in fact likely to increase as a result of the NorthMet Project.
III. While mercury loadings to the Partridge, Embarrass, and St. Louis Rivers are discussed, there is no adequate consideration of the fact that more of the mercury entering these systems will be in the form of methyl, rather than inorganic, mercury. This has the potential to greatly impact fish tissue mercury in these systems and the subsequent risk to fish consumers, both human and wildlife.

Each of these three points is explained, in brief, below.

I. Increased Mercury Loadings to the Embarrass River are not Legally Permittable

The Embarrass River flows through a chain of lakes including Wynn, Sabin, Embarrass, and Esquagama Lakes. Each of these lakes are on the 303(d) Impaired Waters List for mercury in fish tissue. In addition, Wynn and Sabin Lakes are on the proposed 2014 303(d) Impaired Waters list for mercury in the water column. According to the U.S. 9th Circuit Court of Appeals in the case of *Friends of Pinto Creek vs. the U.S. EPA* ("The Carlota Decision"), a new discharge that would further degrade waters with existing water quality impairments could not be permitted. The decision further clarified that the Clean Water Act ("CWA") does not have a provision that allows for "trades" in which increased pollutant discharges to one waterbody can be offset by decreases to another. Therefore it appears that under the CWA, a new source such as the NorthMet Project cannot discharge additional mercury to these mercury impaired waters. According to the PFEIS, the NorthMet project would increase mercury loadings to the Embarrass River (which includes the lakes through which it passes) by 0.2 g/year (from 22.3 to 22.5 g/year). This does not appear, based on the Carlota Decision, to be permittable. Similarly, based on the Carlota Decision, it does not appear that the additional loading can be offset by decreases in mercury loadings to the Partridge River, as argued in the PFEIS.

According to federal regulations [40 CFR 1502.16 (c)], a proposed action's EIS must include a discussion of "possible conflicts between the proposed action and the objectives of federal, regional, state, and local land use plans, policies and controls for the area concerned." It is further stated in 40 CFR 1506.2 (d) that "to better integrate environmental impact statements into state or local planning processes, statements shall discuss any inconsistency of a proposed action with any approved state or local plan and laws (whether or not federally sanctioned). Where an inconsistency exists, the statement should describe the extent to which the agency would reconcile its proposed action with the plan or law." One such program with which the NorthMet Project is inconsistent is the Lake Superior Binational Program's Zero Discharge Demonstration Program (ZDDP), as described in the Lake Superior Lakewide Management Plan (LaMP).

The ZDDP established Lake Superior as a demonstration project to achieve zero discharge and zero emission of nine toxic, persistent, and bioaccumulative chemicals, including mercury, from within the Lake Superior basin by 2020. The LaMP Critical Contaminants Goal further states that "levels of persistent, bioaccumulative, and toxic chemicals should not impair beneficial uses of the natural resources of the Lake Superior basin." The PFEIS only mentions the ZDDP and the LaMP once, and only in Appendix A (A-399, Theme MERC 01; A-455 Theme PERM 27) in response to previous concerns raised about the failure to discuss the Project's inconsistencies with these programs. The MERC 01 Thematic Response describes the ZDDP, but in no way discusses how the Project would address the fact that increased mercury loadings to the Embarrass River are in direct violation of the objectives of the ZDDP. Theme PERM 27 raises

the concern that the Project is inconsistent with the LaMP, but the Thematic Response states only that, if permitted, the Project would be required to comply with applicable laws and regulations. There is no attempt in the PFEIS to reconcile the proposed action with the objectives of LaMP and the ZDDP, as is required for an EIS under 40 CFR 1502.16 (c) and 40 CFR 1506.2 (d).

All surface waters within the Lake Superior basin, including all NorthMet Project area waters, are designated Outstanding International Resource Waters (OIRW) under Minnesota (MN) Administrative Rule 7050.0470. MN Rules 7052.0300 and 7052.0350 prohibit any new or expanded point source discharges of bioaccumulative substances of immediate concern (BSIC), including mercury, to any OIRW. Thus, under MN law, as under the federal law as described above, increased mercury loadings to the Embarrass River, or any other likely affected surface waters, do not appear to be permittable.

All waters likely to be impacted by the NorthMet Project lie within the 1854 ceded territories. Several Chippewa tribes retain the right to hunt, fish, and gather throughout this territory, according to the 1854 Treaty of LaPointe. The federal government has a trust responsibility to the Bands to maintain these treaty resources. The fact that the NorthMet Project would increase mercury loadings to the Embarrass River and the chain of lakes through which it flows (Wynn Lake, Sabin Lake, Embarrass Lake), which are already listed on the 303(d) Impaired Waters list for mercury in fish tissue, represents an adverse impact to a critical trust resource and should not be permitted. Treaty fishing rights cannot be fully exercised when mercury contamination causes fish consumption to be restricted to protect human health.

II. Mercury Loadings to the St. Louis River are Likely to Increase as a Result of the NorthMet Project

The PFEIS predicts that there will be a small decrease in mercury loadings to the Partridge River and thus an overall net decrease in mercury loadings to the St. Louis River, despite increased mercury loadings to the Embarrass River. In addition to the fact that a "tradeoff" between increased mercury loadings in the Embarrass River and decreased loadings in the Partridge River does not appear to be permittable (as described in Part I, above), critical flaws in the analysis of mercury in the PFEIS have led to incorrect conclusions about mercury loadings from the NorthMet Project. It is likely the Project will actually result in a net increase in mercury loadings to the St. Louis River.

Numerous critiques of the mercury mass balance analyses were submitted by GLIFWC staff and others as comments on the Project's SDEIS. None of these concerns were addressed in the PFEIS. Therefore, rather than detail each issue here, the main points are summarized.

1. The mass balance is based on flow estimates from flawed hydrologic models. A mass balance, by definition, relies on accurate estimations of concentration and flow. As a

result, the accuracy of the predicted mercury loadings from the mass balance analyses is unreliable. See the hydrologic section of GLIFWC's comments on the PFEIS for detail of the hydrology modelling issues that have been identified.

2. The mass balance at the plant site is dependent upon the assumption that the NorthMet tailings will adsorb mercury in a similar capacity as the existing LTVSMC tailings. This assumption is based on a 2006 bench top study conducted by Northeast Technical Services, Inc. (NTS). Study details can be found in Appendix B of PFEIS reference "Barr 2007d." This study is insufficient to predict the magnitude of mercury adsorption by the NorthMet tailings. The flask test was conducted over only an 8 hour period to model a centuries long process. There was only one sample with no replication and no attempt to mimic in situ conditions. Further, the study results were incorrectly interpreted, stating that after rapid initial adsorption, mercury levels remained stable throughout the experiment. In reality, the mercury concentrations in the water nearly doubled between hours 4 and 8, when the experiment was terminated, increasing from <0.5 to 0.9 ng/L. If this trend continued, the water would exceed the 1.3 ng/L GLI standard for mercury by hour 12.
3. A superior test of the ability of NorthMet tailings to adsorb mercury was also performed by NTS, but was not discussed in the PFEIS. Details can be found in the PFEIS reference "SRK 2007b" (see discussion of mercury on page 82 of the reference). In contrast to the 8 hour bench top study, the results indicated that precipitation coming into contact with Duluth Complex rock decreased from 12 to 1.9-3.6 ng/L over 32 days, suggesting while the tailing may have some capacity to adsorb mercury, the tailings basin water is still unlikely to meet the 1.3ng/L GLI standard.
4. The mass balance at the plant site is dependent upon the assumption that the existing LTVSMC tailings will continue to adsorb mercury in perpetuity. But, adsorption sites can saturate after sufficient exposure to mercury containing waters, allowing the mercury to flow through the system unimpeded. In addition, the adsorption sites can be unstable as a result of environmental conditions such as changes in pH, resulting in the release of previously adsorbed mercury. In fact, there is already existing seepage from the LTVSMC tailings exceeding the 1.3ng/L GLI standard, as shown in Table 4.2.2-35 of the PFEIS.
5. The mine site mass balance does not account for seepage from the saturated overburden at the OSLA. This material contains sequestered mercury from past deposition. This is a particular concern for the peat overburden, as peat is known to be particularly efficient at sequestering mercury. There is no estimate of the amount of mercury in these materials or their propensity to release mercury when water moves through them.
6. The mine site mass balance and estimates of mercury concentrations in the West Pit are supported by data presented in the PFEIS for analog lakes. The data (PFEIS Table 5.2.2-49) shows average mercury concentrations of 0.66 and 0.97 ng/L for analog natural seepage lakes and pit lakes, respectively. The more detailed source data for this summary table can be seen in Section 6.6 of the PFEIS reference "Polymet 2015m." At least 6 of the 26 analog lakes had individual samples over the GLI standard of 1.3ng/L, and two lakes had average concentrations above 1.3ng/L. Further, data collected by the Fond du

Lac Band [available upon request] on total mercury in concentrations in seepage lakes on or near the Fond du Lac reservation between 2011 and 2014 suggest that levels may be much higher in analog natural seepage lakes closer to the proposed Project, than those presented in the FEIS which were further away in Voyagers National Park and sampled over a decade ago. For the 27 lakes sampled by the Fond du Lac Band, 22 had individual samples over the 1.3ng/L GLI standard, and 20 had mean concentrations exceeding 1.3ng/L. Of the 59 samples collected and analyzed from these lakes, 36 (61%) exceeded 1.3ng/L. This suggests that the analog lakes chosen for analysis in the PFEIS are not representative of area lakes and underestimate the predicted West Pit mercury concentration. It is likely that the mercury concentration in the West Pit will exceed the GLI standard.

7. The mass balance analyses do not include mercury from air deposition, which has been quantified but is only treated independently. Appropriately accounting for the mercury reaching the Partridge and Embarrass River watersheds as a result of air deposition would increase the estimated mercury loadings to these systems calculated in the mass balance analyses.
8. There is little confidence in the predicted tailings basin seepage capture rates, causing this mercury source to be underestimated. Predicted compliance with water quality standards is entirely dependent on the assumption that >90% of the seepage will be captured. The seepage capture efficiencies assumed in the PFEIS are overly optimistic considering that the seepage capture systems at the MINNTAC tailings basin and the southern toe of the LTV basin have not been able to achieve these high efficiency rates. Any water that is not captured by the proposed capture systems that enters the waters of the U.S. is subject to NPDES permitting.
9. The PFEIS further states that the mass balance estimates are conservative because waters will be further treated by reverse osmosis (RO) to remove additional mercury. According to PFEIS reference "Barr 2013f", mercury capture rates by RO are known to be as low as 22%. Further, the capture rate is highly dependent on the form of mercury, with only particulate mercury generally being captured. Capture efficiency for free mercury is much lower. The only available data for methylmercury shows that RO is not capable of removing methylmercury.

In addition, a mass balance approach is not the most appropriate mechanism for predicting mercury loadings to the Partridge and Embarrass Rivers, and ultimately the St. Louis River. The PFEIS did not include mercury in the GoldSim model as it did for other models, citing an insufficient data and a lack of understanding of mercury dynamics. No reasonable attempt was made to model the impacts of mercury due to the NorthMet Project, even though other applicable models exist and should have been implemented. The adherence of the Project to applicable mercury water quality standards cannot be adequately determined without such modelling data.

III. Increases in the Relative Amount of Methylmercury Will Impact Fish Tissue Mercury

Due to the likely increase in mercury methylation, as described below, the NorthMet Project has the potential to increase fish tissue mercury in the St. Louis River watershed, which lies within the 1854 ceded territory where a number of Chippewa Bands exercise treaty fishing rights. Increases to fish tissue mercury, for which these waters are already impaired, impact the treaty rights of the Bands to harvest fish. Treaty-reserved rights cannot be fully exercised when fish consumption must be restricted to protect human health. Any increase in mercury bioavailability to the Partridge, Embarrass, or St. Louis River watersheds constitutes a significant adverse impact to a critical trust resource.

GLIFWC staff believe that total mercury loading to the St. Louis River is likely to increase as a result of the NorthMet Project, as described in Part II, above. In addition, we assert that the PFEIS is deficient in its characterization of methylmercury. The methylmercury data presented in surface and groundwater is insufficient to describe the current conditions and methylating environment. As a result, the potential impacts the Project is likely to have on mercury methylation, such as from changes in sulfate concentrations, hydrology, and water quality are not easily assessed. It is our expert opinion that the Project will result in a higher percentage of mercury in the form of methylmercury in receiving and downstream waters which will result in increased mercury entering the aquatic food web and ultimately higher fish tissue mercury. If a higher percentage of total mercury is released in the form of methylmercury, changes in fish tissue mercury are not directly proportional to changes in total mercury loads, as stated in the FEIS.

The WWTP design, which utilizes reverse osmosis, is not only inefficient at removing non-particulate inorganic mercury, it is not capable of removing any methylmercury, as stated in the PFEIS reference "Barr 2013f". This is of particular concern because the seepage capture system isolates a portion of existing wetlands between the capture system and the basin that will receive most of the mercury coming from the tailings basin. Wetlands provide a prime mercury methylating environment. In addition, the groundwater at the toe of the tailings basin is predicted to be very high in sulfate, which will further accelerate mercury methylation. The result will be a much greater proportion of the mercury entering the WWTP being in the form of methylmercury than is found in the current environment. Since there is no technology in place to remove this methylmercury, it will be discharged to the Embarrass River increasing fish tissue mercury in downstream waters, including the St. Louis River.

The PFEIS limits its analysis of methylmercury to simple proportionality to total mercury, without considering other factors that affect mercury methylation, incorrectly claiming that the factors and mechanisms affecting methylation are poorly understood. In fact, many factors affecting mercury methylation are known (e.g. sulfate concentration, type and activity of

methylating bacteria, pH, organic matter, dissolved oxygen, etc.) and models exist for predicting mercury methylation.

Ombrotrophic bogs, which are peat-dominated, primarily rain-fed, and acidic, are extremely efficient mercury methylating environments. This methylation can be further enhanced by the addition of sulfate containing runoff. The PFEIS does not present a consistent model for mine site hydrology. For many years the lead agencies have maintained that these peatland bogs are "perched" and therefore independent from any mercury and sulfate impacts on receiving waters (See GLIFWC comments on hydrology). In contrast to this position, the PFEIS states that water can move from the surficial aquifer (where the wetlands are) to bedrock in a dewatering situation (PFEIS page 5-109). These conflicting conceptual models of mine site groundwater hydrology are mutually exclusive. For mercury and methylmercury related conclusions to be defensible, a consistent model of the mine site hydrology must be developed. Any wetlands that have at least a partial connection to the groundwater should be considered a potential source of methylmercury. Enhanced vertical hydraulic gradients resulting from mine pit dewatering could result in significant interactions between the bogs and groundwater, even dewatering wetlands that may be entirely surface water dependent under normal conditions. If groundwater under these wetlands were to be drawn down, the wetlands would be impacted and there would be a likely dewatering of peat deposits. This cycle of wetland dewatering and rewetting is known to enhance mercury methylation. The resulting effect on methylmercury production and release, and ultimately on fish tissue mercury, have not been adequately evaluated in the PFEIS.